

REMARKS

The Non-Final Office Action mailed from the Patent Office on September 04, 2007, has been reviewed and the Examiner's comments carefully considered. Prior to this paper, claims 13-31, 33-35, 38-46, 51-52, 54-55 and 57 were pending, with claims 21-31, 34, 38 and 41 being withdrawn. By this paper, Applicants do not add or cancel any claims. Therefore, claims 13-31, 33-35, 38-46 and 51-52, 54-55 and 57 remain pending.

Applicants respectfully request reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

Claim Rejections Under 35 U.S.C. § 112, First Paragraph

Claims 13-31, 33-35, 38-46, 51-55,¹ and 57 are rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. Applicants traverse this rejection.

As a preliminary matter, Applicants have previously amended the specification to explicitly recite the recitations of claims 13, 52, 54 and 55. As to the merits of the rejections:

I. Claim 13 - The skilled artisan would have recognized that Applicants disclosed stainless steel fibers made from a high temperature alloy.

A. It was known to the skilled artisan that Fecralloy is a high temperature alloy, and that the disclosure of Fecralloy simultaneously disclosed a high temperature alloy.

1. Applicants point to the paper "Oxidation Resistance of Filter Materials" (see Appendix A), which demonstrates that the trade name "Fecralloy" was known to the skilled artisan in the year 1981 (before Applicants' filing date), which demonstrates

¹ Note claim 53 was cancelled in the last Response.

that Fecralloy is an *alloy* (see page 2 – Fe, Cr, Al, Y), and that Fecralloy is a *high temperature* alloy (see page 1 – use of Fecralloy at 600 degrees Celsius).

2. Applicants point to U.S. Patent No. 4,780,445 to Jung (previously presented by Applicants) as further evidence of the disclosure of the recited elements. Specifically, col. 2, lines 53-54, includes the reference to:

a “*high temperature alloy* such as the Kanthal or *Fecralloy* type alloys, . . .”

(Col. 2, lines 53-54, emphasis added.) The '445 patent was published in 1988, almost a full decade prior to the filing of the Belgian priority application. Accordingly, the skilled artisan, as of the filing date of the present application, would have recognized that the disclosure of Fecralloy disclosed a “high temperature alloy.” Therefore, claim 13 is supported by the specification as originally filed.

B. The specification, by itself, discloses the use of a high temperature alloy.

Notwithstanding the one-to-one teaching in “Oxidation Resistance of Filter Materials” and in Jung that Applicants disclosed a high-temperature alloy, logic requires acknowledgement of such a disclosure. First, Applicants disclosed an “alloy,” as evinced by the fact that they disclose stainless steel fibers (stainless steel is an alloy). Second, Applicants disclosed that they use that alloy (*i.e.*, stainless steel fibers) in a burner membrane which is subjected to a *blue flame heat flux of up to 5000 kW/m²*. Thus, Applicants teach the use of the alloy in a high temperature environment. Third, Applicants enable a burner membrane for use at 5000 kW/m². Accordingly, the membrane made of those alloy fibers is a high temperature burner membrane. Fourth, the high temperature burner membrane, in an exemplary embodiment disclosed in the specification, is made singularly from an alloy of fibers. If that alloy of fibers was not a high temperature alloy, the burner membrane would not be a high temperature burner membrane. Accordingly, the specification disclosed a high temperature alloy.

II. Claim 52 - The skilled artisan would have recognized that Applicants disclosed stainless steel fibers made from a high temperature oxidation resistant alloy.

A. It was known to the skilled artisan that Fecralloy is a high temperature oxidation resistant alloy, and that the disclosure of Fecralloy simultaneously disclosed a high temperature oxidation resistant alloy.

1. Applicants point to the paper "Oxidation Resistance of Filter Materials" (see Appendix A), which demonstrates that the trade name "Fecralloy" was known to the skilled artisan in the year 1981 (before Applicants' filing date), which demonstrates that Fecralloy is an alloy (see page 2 – Fe, Cr, Al, Y), that Fecralloy is a **high temperature** alloy (see page 1 – use of Fecralloy at 600 degrees Celsius), and that Fecralloy is an oxidation resistant alloy (see title, see page 1).

2. Applicants point to U.S. Patent No. 4,288,346 to Hunter (previously presented by Applicants) as further evidence of the disclosure of the recited elements. Specifically, col. 2, lines 58-59, includes the reference to:

"[h]igh temperature oxidation resistant alloys, e.g. the 'Kanthal' and 'Fecralloy' types,"

(Col. 2, lines 58-59, emphasis added.) The '346 patent was published in 1981, over 15 years prior to the filing of the Belgian priority application. Accordingly, the skilled artisan, as of the filing date of the present application, would have recognized that the disclosure of Fecralloy disclosed a "high temperature oxidation resistant alloy."

III. Claim 54 – The skilled artisan would have recognized that Applicants disclosed stainless steel fibers having an elemental composition consisting essentially of Al, Cr, Y and a balance Fe.

A. Regarding claim 54 - it was known to the skilled artisan that Fecralloy is a high temperature oxidation resistant alloy, and that the disclosure of Fecralloy simultaneously disclosed a high temperature oxidation resistant alloy.

1. Applicants point to the paper "Oxidation Resistance of Filter Materials" (see Appendix A), which demonstrates that the trade name "Fecralloy" was known to the skilled artisan in the year 1981 (before Applicants' filing date) and which demonstrates that Fecralloy is an alloy having an elemental composition consisting essentially of Al, Cr, Y and a balance Fe (see page 2 – Fe, Cr, Al, Y).

2. Applicants further point to U.S. Patent No. 4,289,652 to Hunter (previously presented by Applicants) as further evidence of the disclosure of the recited elements. Specifically, col. 1, lines 52-55, states that:

"for example, U.S. Pat. No. 3,920,583 which describes a catalyst comprising a substrate made of an alloy or iron, chromium, aluminum and yttrium (commonly called "Fecralloy"), "

(Col. 1, lines 52-55, emphasis added.) The '652 patent was published in 1981, over 15 years prior to the filing of the Belgian priority application.

Applicants further point to U.S. Patent No. 4,127,510 to Harrison (previously presented by Applicants), which refers to U.S. Patent No. 3,920,583 (previously presented by Applicants), to evince support for claim 54. Specifically, col. 5, lines 55-58 of '510, which was published in 1978, makes a reference to a material that is:

"sold under the Registered Trade Mark Fecralloy which is described and claimed in British Patent Application No. 22707/73 (U.S. Pat. No. 3,920,583)"

(Col. 5, lines 55-58, emphasis added.) Claim 1 of U.S. Patent No. 3,920,583, which was published in 1975, claims

"an aluminum bearing ferritic steel substrate, an electrically insulating ceramic layer on a surface of said ferritic steel substrate, and a catalytic

material supported upon the ceramic layer, said aluminum bearing steel substrate comprising an alloy of iron, chromium, aluminum, and yttrium,”

Additionally, '583 describes an “unoxidised aluminum bearing ferritic alloy, specifically that available under the Trade Mark 'Fecralloy,’” at Col. 3, lines 35-37. (Emphasis added.)

Accordingly, between the '652, '510 and '583 patents, it is clear that the skilled artisan would have recognized, at the time that the present application was filed, that Fecralloy has an elemental composition consisting essentially of Al, Cr, Y and a balance Fe.

IV. Claim 55 – the skilled artisan would have recognized that Applicants disclosed stainless steel fibers having an elemental composition of up to 20% Cr, 0.5 to 12% Al, and 0.1 to 3% Y.

A. Claim 55 recites that the fibers “have an elemental composition of up to 20% Cr, 0.5 to 12% Al, and 0.1 to 3% Y.” This recitation is supported by U.S. Patent No. 4,096,095 (previously provided by Applicants), at col. 5, lines 21-23.

In sum, all of the pending claims are supported by the original disclosure.
Reconsideration is requested.

Claim Rejections Under 35 U.S.C. § 103(a)

In the Office Action, claims 13-31, 33-34, 38-46, 51-55,² 57 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Applicants' and Assignee's own prior work to advancing the art. Specifically, the claims are rejected in view of Dewaegheneire (WO 97/04152), when combined with Hunter (U.S. Patent No. 4,214,867), Assignee Bekaert's EP 0268146, and Krupnik (U.S. Patent No. 6,298,538). Further, claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable over the just-mentioned references when further

² Note claim 53 was cancelled in the last Response.

combined with DeBruyne (U.S. Patent No. 5,088,919). Applicants respectfully traverse the rejections as to the claims above, and submit that these claims are allowable for at least the following reasons.

Lack of a Reasonable Expectation of Success

MPEP § 2143.02 permits references to be modified or combined to reject a claim as obvious only if there is a reasonable expectation of success. There is no evidence in the references, and certainly none identified in the Office Action, that one of ordinary skill in the art would have had a reasonable expectation of success in achieving Applicants' invention. Indeed, there are at least two reasons why the ordinary artisan would not have expected success.

First, a will be discussed in greater detail below, *a needed and compacted* stainless steel fiber web would not have been seen by the ordinary artisan to have had the required coherence to function as a burner membrane in view of the fact that a burner membrane is exposed to extreme heating cycles followed by extreme cooling cycles which creates a tremendous amount of thermomechanical stress in the burner membrane.

Second, *a needed and compacted* burner membrane web would not have been seen as having the minimum degree of porosity recited in the claims. A burner membrane must have a certain amount of porosity to function, else the gasses cannot pass through the membrane. However, the action of needling decreases the degree of porosity. The action of compressing also decreases the degree of porosity. Accordingly, the skilled artisan would not have had a reasonable expectation of success in maintaining at least a 60% porosity after *both* needling and compressing the web.

Applicants submit that either of these two points demonstrates a lack of a reasonable expectation of success on behalf of the ordinary artisan. Thus, one of ordinary skill in the art would not have seen the combination of the references as producing a successful burner membrane and/or a membrane having the a web with the recited porosities. Because of this, the second criteria of MPEP § 2143 has not been met in the Office Action, and a *prima facie* case of obviousness has therefore not been established.

The Cited References Do Not Suggest All Claim Recitations

The third requirement of MPEP § 2143 is that “the prior art reference (or references when combined) must teach or suggest all the claim limitations.”

Independent claim 13 recites a burner membrane comprising at least one layer comprising a needled fiber web. Claim 13 requires that, among other requirements,

- i) the needled web be compressed to the porosity of between 60% and 95%, and
- ii) the compression to the recited porosity be executed in a step subsequent to the needling step.

The cited references, even after combination, fail to result in a burner membrane having these two requirements.

The Office Action recognizes that the cited references fail to teach or suggest the recited porosities. Instead, the Office Action states that with “regard to the particular porosity claimed, since needling is known in the art as a method by which the density and porosity of a nonwoven can be adjusted and controlled, it would have been obvious . . . to have selected the degree of needling through the process of routine experimentation in order to arrive at a fabric having the desired porosity.” Assuming *arguendo* that this is correct, it still does not result in a combined device that teaches / suggests each element of claim 13, because claim 13 recites that the web is compressed to the recited porosity – the claim does not recite that the web is needled to the recited porosity. That is, claim 13 recites that the needled fiber web is compressed to obtain the porosity. Even if the skilled artisan would have found it a matter of routine experimentation to needle a fiber to obtain the recited porosity, the recited compression (a necessary feature of the invention that has been disregarded in the Office Action – more on this below) would have changed the porosity obtained from needling, and thus the porosity recitation of claim 13 is not present in the resulting combination even after each action proffered in the Office Action is executed.

Further, along the same lines, the specific sequence required by claim 13 is not present in the proffered combination. Claim 13 recites that the web has the features of a web which is

compressed after needling. The Office Action completely ignores this element of claim 13. Thus, yet another element of claim 13 is missing from the proffered combination.

In sum, even if the skilled artisan would have known all that is asserted in the Office Action, the third requirement of MPEP § 2143 is not satisfied in the Office Action, because the cited references do not teach each and every element of the present invention. Thus, the present claims are allowable.

The Level of Ordinary Skill In the Art has Incorrectly Been Ascertained

KSR did not repeal the *Graham v. John Deere Co.* factors - just the opposite, it reaffirmed them. One of those factors is the requirement that the PTO must resolve the level of ordinary skill in the pertinent art. It is respectfully submitted that the PTO presumes a higher level of skill of the ordinary artisan in this art than was actually present in the 1996-1997 timeframe.

As a preliminary matter, Applicants have considerable authority in the matter, as the primary reference Dowaegheneire used against the claims constitutes inventor Dowaegheneire's own work to advance this art.

The ordinary artisan would not have had a level of skill sufficient to render the invention obvious to that ordinary artisan. Specifically, before the disclosure of the present invention, the ordinary artisan would not have had the skill to predict that *a needled and compacted* stainless steel fiber web would have the required coherence to function as a burner membrane in view of the fact that a burner membrane is exposed to extreme heating cycles followed by extreme cooling cycles which creates a tremendous amount of thermomechanical stress in the burner membrane. To the contrary, only the innovator would have had the skill necessary to predict such functionality. The ordinary artisan would not have had the skills to arrive at the present invention without instruction from the innovator.

Lack of a Sufficiently Articulated Rationale to Modify or Combine the References

The Office Action asserts that “needling is known in the art as a method by which the density and porosity of a nonwoven can be adjusted and controlled.” It appears that the Office Action relies on common knowledge in the art, as is discussed and permitted in MPEP § 2144.03. However, Applicants note that § 2144.03 allows an applicant “to traverse such an assertion,” and that when an applicant does so, “the examiner should cite a reference in support of his or her position.” (MPEP § 2144.03, second paragraph.) Absent a citation by the PTO of a reference that can be evaluated for all its teachings, Applicants hereby traverse the assertion that it would have been common knowledge in the art that needling is known as a method by which both the density and porosity of a nonwoven can be both adjusted and controlled. Applicants thus request, relying on § 2144.03, that the PTO cite a reference and exactly identify where such a reference taught, before the date of Applicants' invention, that needling is known as a method by which both the density and porosity of a nonwoven can be both adjusted and controlled, or else allow the claims.

* * * * *

As is recognized in the Office Action, not one of the five references cited against the present invention expressly teach needling (or compression, for that matter) to obtain the recited porosities. In an attempt to remedy this deficiency, the Office Action asserts that it would have been *routine experimentation* to have selected the degree of needling to arrive at the desired porosity. Applicants traverse this assertion.

MPEP § 2144.05 II, entitled “Optimization of Ranges,” does indeed permit the rejection of claims as being obvious based on “routine experimentation.” However, routine experimentation is not a panacea that enables the PTO to automatically overcome deficiencies with respect to specific elements in the prior art. Recognizing the power of the routine experimentation argument, the courts have tempered its use, as is seen in § 2144.05 II(B), which states that

Only Result-effective Variables Can Be Optimized. A particular parameter must *first* be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation. *In re Antonine*

(citations omitted). (The claimed wastewater treatment device had a tank volume to contractor area of 0.12 gal./sq. ft. The prior art did not recognize that treatment capacity is a function of the tank volume to contractor ratio, and therefore the parameter optimized was not recognized in the art to be a result-effective variable.)

(Emphasis added, citations omitted.) As in *In re Antonine*, it is respectfully submitted that no evidence has been proffered that the prior art recognizes that porosity percentages is a function of a degree of needling, and therefore the parameter alleged to be optimized in the Office Action was not recognized in the art to have been a result-effective variable.

* * * * *

The proffered replacement of the knitted fabric of Dewaagheneire with a nonwoven web followed by needling of the nonwoven web for the sole purpose of increasing strength is not consistent with the common sense that the ordinary artisan would have applied at the time of the present invention.³ Specifically, the assertions that the need / desire for a strong web would have rendered the present invention obvious is contrary to common sense. Applicants submit that indeed there was such a need / desire, common sense would have driven the skilled artisan away from the needled web, and instead driven the skilled artisan to maintain the use the knitted fabric of Dewaagheneire.

That is, on the one hand, the Office Action recognizes that Dewaagheneire teaches a knitted fabric – recognized by the artisan as a strong fabric. On the other hand, the Office Action recognizes that Krupnik teaches that nonwoven webs are not strong. The skilled artisan, concerned with the strength of the web, would not have used a nonwoven web when Dewaagheneire teaches that a knitted fabric is perfectly acceptable. Alternatively, if the skilled artisan was not concerned with the strength of the web, thus electing to use the nonwoven web, the rationale proffered in the Office Action for needling the web would be inapplicable.

³ Applicants mean no disrespect – they simply are responding to the new obviousness regime put in place as a result of the KSR decision.

Put another way, the ordinary artisan concerned with strength does not modify Dowaegheneire to make the membrane weaker by using a nonwoven web. If the ordinary artisan was not concerned with strength, the reason to needle the web proffered in the Office Action goes away. Accordingly, common sense dictates that the proffered rationale - the desire / need for a strong web - would not have lead the skilled artisan to the present invention, and instead would have lead the artisan away from the present invention. The skilled artisan would simply have continued using the knitted fabric in Dowaegheneire.

* * * * *

Applicants further note that the proffered rationale for rejecting the claims as obvious fails the PTO's examination guidelines for determining obviousness in view *KSR*.⁴

Request for Rejoinder of Withdrawn Claims

Claims 21-31, 34, 38, 41-46 stand withdrawn. Applicants submit that the remaining claims are *method claims drawn to a method of making an apparatus along the lines of the considered claims*. Pursuant to MPEP § 821.04 and *In re Ochiai*, 71 F.3d 1565 (Fed. Cir. 1995), it is respectfully requested that these claims be rejoined and considered, since MPEP § 821.04 states that "when a product claim is found allowable, applicant may present claims directed to the process of making and/or using the patentable product."

In view of the above, Applicants note that of the withdrawn claims, claims 21, 27, 33, 34 and 41-46 ultimately depend from claim 13. Applicants respectfully request that these claims be rejoined and allowed at least due to their dependency from claim 13, a claim that is allowable.

As to the remaining claims, Applicants submit that these claims are allowable for at least the reasons that make the claims under consideration allowable. Applicants respectfully

⁴ "Examination Guidelines for Determining Obviousness Under 35 U.S.C. 103 in View of the Supreme Court Decision in *KSR International Co. v. Teleflex, Inc.*" (Pages 57526-57535 of the Federal Register, Vol. 72, No. 195.)

submit that no significant burden is placed on the PTO by rejoining and examining all the withdrawn claims. Indeed, many of the withdrawn claims explicitly recite recitations consistent with the above arguments. (For example, claim 22 affirmatively recites that the membrane is not sintered and that the fiber is made from a high temperature alloy.)

Conclusion

Applicant believes that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check or credit card payment form being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Examiner Cole is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

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